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XLVII.—*On the Forms of Squirrel hitherto classed under*
Sc. finlaysoni, Horsf. By R. C. WROUGHTON.

THIS question was discussed by Dr. Anderson in 1879 (Zool. Western Yunnan). He came to the conclusion that the following forms, viz. *finlaysoni*, *ferrugineus*, *keraudreni*, *splendidus*, *cinnamomeus*, *siamensis*, *splendens*, *germani*, *bocourti*, and *leucogaster*, were "only varieties of one and the same species."

It was again investigated by Bonhote in 1901 in dealing with a collection of mammals from Siam (P. Z. S. p. 53). The result was rather unsatisfactory, for while keeping all the forms under the specific name *finlaysoni*, he recognized four "types," but did not distinguish the forms which ranked in each "type."

Since then there have been considerable additions of specimens of this group to the collection of the Natural History Museum, and on laying out the whole and sorting them both geographically and by pattern it seemed to me possible to introduce some commencement of order in the arrangement of the group.

As a preliminary it may be noted that a study of the literature shows that the following names disappear from the list quoted above as synonyms, viz. *keraudreni*, Less., = *ferrugineus*, Cuv.; *siamensis*, Gray, and *splendens*, Gray, = *cinnamomeus*, Temm.; *leucogaster*, M.-Edw., and *leucocephalus*, Bonh., = *bocourti*, M.-Edw.

By the courtesy of Dr. H. O. Forbes, of the Liverpool Museum, who sent Gray's type for inspection, I am in a position to state that *Sc. splendidus* has nothing to do with this group and must be deleted from the list. On the other hand, *harmandi*, M.-Edw. (from the island Phu Kok), must be added to it.

Of the new list thus formed, *finlaysoni*, Horsf., *germani*, M.-Edw., and *harmandi*, M.-Edw., represent island forms which are apparently quite fixed and show no signs of intergradation with any other forms. I propose to rank them all as distinct species.

A large black form from the sea-coast south of Bangkok, though a mainland form, also shows absolutely no signs of intergradation with other forms, nor, indeed, so far as our material goes, of variation of any sort, and should therefore be accepted as a good species.

The black feet in *ferrugineus*, the all-red squirrel of Pegu, are so absolutely constant and characteristic that it too must be given specific rank.

The all-red squirrel of Siam, *cinnamomeus*, Temm., is a somewhat doubtful case. Temminck based his *cinnamomeus* on three specimens, and he felt obliged to describe each one as a separate variety. Gray based his *splendens* on four specimens from Cambodia, and he, too, described each of them as a separate variety. Gray's *siamensis* is a very young specimen, labelled merely "Siam"; it is unlike any other form I know, in pattern; until more material shows that it belongs elsewhere, I have left it as a synonym of *cinnamomeus*. Hence it is evident that the red squirrel of Cambodia varies enormously, but I have failed to detect any intergrading with neighbouring forms. Mr. Lyle has sent a long series of a quite similar red squirrel from the upper valley of the Me Nam, and there, curiously enough, the form seems to be "fixed," and to correspond fairly closely with one of Gray's varieties of *splendens* and also with two specimens in this Collection from Chantaboon and the adjoining island Phu Kok. Finally, both among the southern series and the northern Me Nam series, side by side with the red specimens appear pure white ones, and of the white specimen from the Me Nam, at any rate, Mr. Lyle records that it has black eyes. Notwithstanding this extraordinary tendency to variation, however, in the absence of any proof of intergradation with other forms I feel myself justified in treating *cinnamomeus* as a good species.

Finally, we have a number of forms inhabiting the Bangkok River with its feeders the Me Nam and the Me Ping.

The first of these, extending the whole way along the main stream and a short way along the eastern tributary, has already received from Milne-Edwards the name *bocourti*. It may be described broadly as grizzled above, pure white below, with a greyish-brown tail obscurely barred with ferruginous; but in a series of twenty specimens the only constant character is a white belly (and even this is replaced by a red-brown one in two other specimens); the dorsal ground-colour varies from almost black, through brown, to a pale grey, and the white of the lower surface extends in a varying degree to the head, the feet, the tail, and even partially to the back. Higher up the Me Nam and on the lower and upper Me Ping are found three forms which, though intergrading with each other and to some extent with *bocourti*, seem in those three localities to have attained a certain modified fixity, and are, in my opinion, worthy of being described as subspecies.

The following is a key to the group as I now propose to arrange it:—

Key.

A. Unicoloured.

a. All red.

- a*¹. Feet black. (Pegu.) (1) *ferrugineus*, Cuv.
*b*¹. Feet golden red. (Siam.) (2) *cinnamomeus*, Temm.

b. All black.

- a*¹. Size large: hind foot 51 mm.; skull
 54. (Bangkok.) (3) *nov.*, sp. n.
*b*¹. Size small: hind foot 42 mm.; skull
 47. (Pulo Condor.) (4) *germani*, M.-Edw.
c. All white. (Sichwan Island.) (5) *finlaysoni*, Horsf.

B. Parti-coloured.

- a*. Hind foot 53 mm.; tail with no red
 colouring. (Phu Kok.) (6) *harmandi*, M.-Edw.

- b*. Hind foot at most 49 mm.; distal $\frac{2}{3}$ of
 tail maroon or bay.

- a*¹. Belly white; bullæ parallel-sided.
 (Bangkok River.) (7) *bocourti*, M.-Edw.

- b*¹. Belly coloured: subbasal white patch
 on tail; inner face of bullæ swollen.

- a*². Grizzled brown and buff, with a
 few all-white hairs; hind foot
 43 mm. (Upper Me Nam Val-
 ley.) (8) *b. sinistralis*, subsp. n.

- b*². Grizzled brown and buff, with
 about half the hairs all white;
 hind foot 46 mm. (Lower Me
 Ping Valley.) (9) *b. dextralis*, subsp. n.

- c*². Smoke-grey; hind foot 49 mm.
 (Chiengmai.) (10) *b. lylei*, subsp. n.

(1) *Sciurus ferrugineus*, F. Cuv.1829. *Sciurus ferrugineus*, F. Cuvier, Mamm. pl. cccxxviii.1830. *Sciurus keraudreni*, Lesson, Cent. Zool. pl. i.

Cuvier gives for this animal the vague habitat "India," but Lesson, who recognizes in a footnote (*l. c.*) that his animal is the same as *ferrugineus*, locates it "from the vast forests of Pegu."

Sc. ferrugineus is a uniform red-brown (between hazel and chestnut) except (as pointed out by both the authors quoted above) that the extreme tip of the tail is white and the hands and feet black.

The Museum has a series of six specimens presented by Major Harington, who collected them at Rangoon. They agree without variation with the above description.

Dimensions of an old male:—

Head and body 230 mm.; tail 225; hind foot 52; ear 20.

Skull: greatest length 56; basilar length 44; zygomatic breadth 33; brain-case breadth 25; interorbital breadth 19; nasals, length 16·5, proximal breadth 4·2, distal breadth 8; diastema 12·5; upper molar series 11.

(2) *Sciurus cinnamomeus*, Temm.1853. *Sciurus cinnamomeus*, Temminck, Esq. p. 250.1860. *Sciurus siamensis*, Gray, Ann. & Mag. Nat. Hist. v. p. 500 (juv.).1861. *Sciurus splendens*, Gray, P. Z. S. p. 137.

This is a most variable form. The type of *siamensis* is a quite young animal, but is interesting in being entirely grizzled orange-red on black, above. The four specimens described as varieties 1, 2, 3, and 4 of *splendens* by Gray I have examined. Vars. 3 and 4 are very pale specimens (paler than orange-rufous), and one of them shows traces of grizzling on the limbs and cheeks; var. 1, on the other hand, is a very dark specimen (near bay), unicoloured except for an abnormal white patch on the tail, which recalls the similar patch characteristic of *Sc. bocourti sinistralis*, *lylei*, &c. Var. 2 is intermediate between these extreme forms, and, I believe, represents the normal one. A specimen collected by Capt. S. S. Flower at Chantaboon agrees closely with it, though still showing faint traces of grizzling on the limbs and cheeks. Finally, there is a series of six specimens collected by Mr. Lyle on the upper Me Nam which differ little from this type except that the under surface is darker, and thus the whole animal is unicolorous (near cinnamon-rufous). The tendency to develop a white tail-tip is evident in all these specimens, and

from both Cambodia (*Capt. S. S. Flower*) and the upper Me Nam (*Mr. J. H. Lyle*) absolutely white specimens have been received which were found side by side with the red variety. Mr. Lyle specially notes that these white specimens have black eyes. Face to face with such bewildering variation I have concluded to accept Gray's "*splendens* var. 2," Capt. Flower's Chantaboon specimen, and Mr. Lyle's series from the upper Me Nam as the normal of the species.

Dimensions of an adult female of Mr. Lyle's series:—

Head and body 220 mm.; tail 236; hind foot 53; ear 20.

Skull: greatest length 56; basilar length 45; zygomatic breadth 32; brain-case breadth 25; interorbital breadth 19.5; nasals, length 16, proximal breadth 4, distal breadth 8; diastema 13.5; upper molar series 11.

This species differs from the preceding in the complete absence of the black-coloured feet, the constant presence of which is so characteristic of *ferrugineus*.

(3) *Sciurus nox*, sp. n.

Size rather smaller than *cinnamomeus*.

Colour uniform jet-black above and below.

Dimensions of type (taken in the flesh):—

Head and body 207 mm.; tail 164 (broken, probably 210); hind foot 51; ear 21.

Skull: greatest length 53.5; basilar length 42.5; zygomatic breadth 32; brain-case breadth 26; interorbital breadth 18.6; nasals, length 16.3, breadth proximally 4.5, breadth distally 7.3; diastema 12; upper molar series 10.

Hab. Sea-coast south of Bangkok.

Type. Old male. B.M. no. 6. 10. 7. 4. Original number 214. Collected by Mr. T. H. Lyle on 7th August, 1906, and presented by him to the Natural History Museum.

A series of eight specimens, of which one is quite young. There is not the smallest sign of variation through the whole series.

(4) *Sciurus germani*, A. M.-Edw.

1867. *Sciurus germani*, A. Milne-Edwards, Rev. Zool. p. 193.

The type-locality is the island Pulo-Condor, off the coast of Cambodia. Milne-Edwards gives the head and body as 230 mm. and the tail of equal length, but he was dealing with skins. Judging from two specimens from the same island in the Museum Collection, the following are approximate dimensions of this species:—

Head and body 190 mm.; tail 190; hind foot 42; ear 20.

Skull: greatest length 47; basilar length 37; zygomatic breadth 28; brain-case breadth 22; interorbital breadth 17·3; nasals, length 15, proximal breadth 3·5, distal breadth 6·3; diastema 10·6; upper molar series 9·6.

These skull-measurements are taken from a rather old individual.

(5) *Sciurus finlaysoni*, Horsf.

1824. *Sciurus finlaysoni*, Horsfield, Res. Java.

The type-locality is the island of Sichang.

The animal is completely white and is expressly stated to have black eyes and black soles to the feet.

Dimensions of the type (an old animal):—

Head and body 175 mm.; tail 175; hind foot 43; ear 20.

Skull: greatest length 46; basilar length 36·5; zygomatic breadth 28; brain-case breadth 22; interorbital breadth 17·3; nasals, length 13, proximal breadth 4·5, distal breadth 7·3; diastema 11; upper molar series 8.

(6) *Sciurus harmandi*, A. M.-Edw.

1876. *Sciurus harmandi*, A. Milne-Edwards, Bull. Soc. Philom. (6) xii. p. 8.

The type-locality is Phu Kok, an island off Chantaboon.

General colour above near "walnut-brown," but almost completely hidden by white, the individual hairs each half grey, half walnut-brown, in that order from the base upwards; with a very large proportion of longer, white, black-tipped hairs; below white, largely tinged with walnut-brown. Cheeks and throat darker. Limbs brown, faintly grizzled with buff; hands vinaceous cinnamon, feet cinnamon-rufous. Tail like back at immediate base, thereafter mixed black and white, *i. e.* hairs black with white tips (according to M.-Edwards these white tips are tinged with reddish in the type).

Milne-Edwards gives the dimensions as: head and body 260 mm.; tail 250—but these were probably taken on a skin or stuffed specimen. The true size is apparently exactly the same as that of *cinnamomeus*.

The following are measurements of an adult skull:—

Greatest length 56 mm.; zygomatic breadth 32; brain-case breadth 24·5; interorbital breadth 20; nasals, length 16, breadth proximally 4·5, breadth distally 7·2; diastema 12·5; upper molar series 11.

The dorsal pattern is like that of *bocourti dextralis*, but the black and white tail serves to distinguish it at once.

(7) *Sciurus bocourti*, A. M.-Edw.

1867. *Sciurus bocourti*, A. M.-Edwards, Rev. Zool. p. 193.

1867. *Sciurus leucogaster*, A. M.-Edwards, Rev. Zool. p. 196.

1901. *Sciurus leucocephalus*, Bonhote, P. Z. S. p. 54.

The type-locality of *S. bocourti* was Ayuthia, on the river north of Bangkok. *S. leucogaster* came from "Pexabury," close to Bangkok, and is evidently a young individual of this species. The Museum has a long series from Ayuthia, collected by Capt. S. S. Flower, and others from various points on the river still further north, and some from the Me Nam feeder as far north as Pichit, collected by Mr. T. H. Lyle, beyond which point it is replaced by the next form. It is a form which varies extraordinarily in colouring. Milne-Edwards gives the ground-colour as "un fauve roux et noirâtre"; in a series of over twenty specimens I find all grades of colour, from almost black, through "seal-brown" and "chocolate," to a quite pale "smoke-grey," in all cases grizzled with pale buff. The under surface is white, but in certain individuals this extends to the feet, in others to the face and head also, and in yet others the tail has become white. Finally, in the series from Ayuthia are two abnormal individuals in which white is entirely absent, even the belly is chestnut. These specimens approach the form next described, except for the absence of the subbasal pale spot on the tail which so constantly characterizes the latter.

Dimensions of an adult male :—

Head and body 192 mm.; tail 198; hind foot 45; ear 20.

Skull: greatest length 50; basilar length 39; zygomatic breadth 31; brain-case breadth 23; interorbital breadth 18.5; nasals, length 15, breadth proximally 3.5, breadth distally 7.7; diastema 11.2; upper molar series 10.5.

(8) *Sciurus bocourti sinistralis*, subsp. n.

Slightly smaller than typical *bocourti*.

General colour above black or "clove-brown," grizzled (finely) with buff, with a certain number of all-white hairs sprinkled over the back. Face, including the ears, suffused with bright "hazel." Under surface near "hazel"; hands and feet dark, almost black. Tail for a short distance (30 mm.) coloured like back, then for some distance (45 mm.) almost white (the hairs white, with black tips), the rest of the tail bright "bay," an obsolescent black and buff barring still traceable at the bases of the hairs.

Dimensions of the type (measured in the flesh) :—

Head and body 191 mm.; tail (c.) 190; hind foot 43; ear 20.

Skull: greatest length 49; basilar length 38; zygomatic breadth 30; brain-case breadth 22·6; interorbital breadth 18; nasals, length 14, breadth proximally 4·3, breadth distally 7; diastema 11; upper molar series 9·6.

Hab. Me Nam River (type from "below Pichit," alt. 117').

Type. Adult male. B.M. no. 3. 8. 5. 8. Original number 186. Collected June 8th, 1903, by Mr. T. H. Lyle, and presented by him to the Museum.

A series of eight specimens from various points on the Me Nam from its junction with the Me Ping northwards to Pitsanulok. Two or three of these specimens show, by an increase of the all-white hairs scattered through the coat, an approach to the next form, from the Me Ping. A series of four individuals from a western feeder of the Me Nam all show a similar modification.

(9) *Sciurus bocourti dextralis*, subsp. n.

Size rather larger than either *b. sinistralis* or typical *bocourti*.

General colour above as in *b. dextralis*, but the proportion of all-white hairs greatly increased (to almost one-half of the whole) and the face more brightly coloured. Under surface a dark shade of cinnamon-rufous approaching chestnut.

Dimensions of the type (taken in the flesh):—

Head and body 206 mm.; tail 184; hind foot 46; ear 20.

Skull: greatest length 52; basilar length 41·5; zygomatic breadth 30; brain-case breadth 24; interorbital breadth 18·3; nasals, length 16, breadth proximally 3·5, breadth distally 7·3; diastema 12; upper molar series 10·3.

Hab. Lower Me Ping Valley (type from Kampeng, alt. 375').

Type. Adult female. B.M. no. 0. 10. 7. 9. Original number 109. Taken 3rd Feb., 1900, by Mr. T. H. Lyle, and presented by him to the Museum.

A series of six specimens, from various points on the Me Ping, from its junction with the Me Nam northwards to Raheng, are, on the whole, fairly uniform, but one specimen from Raheng approaches, by the almost complete substitution of white hairs (some of them black-tipped) for the usual black with buff tips, to the following more northerly form.

(10) *Sciurus bocourti lylei*, subsp. n.

Size largest among the forms of *bocourti*.

General colour above smoke-grey, individual hairs mouse-grey basally, then white, a large proportion with black tips. Face and head faintly washed with orange-rufous. Tail basally (50 mm.) coloured like the back, then (50 mm.) white, and finally bright cinnamon-rufous. Hands and feet finely grizzled black and white. Under surface a pale bright orange-rufous.

Dimensions of type (taken in the flesh):—

Head and body 213 mm.; tail 200; hind foot 49; ear 20.

Skull: greatest length 51 (54)*; basilar length 40 (43); zygomatic breadth 30 (32); brain-case breadth 23·5 (24); interorbital breadth 18 (20); nasals, length 14 (16·5), breadth proximally 4, breadth distally 7; diastema 11·1 (12·6); upper molar series 10·3.

Hab. Chiengmai on the Me Ping.

Type. Adult female. B.M. no. 7. 11. 13. 11. Original number 242. Taken by Mr. T. H. Lyle on 12th August, 1907, and presented by him to the Museum.

Three specimens examined, all very like one another. The complete absence of either red or brown in the coat (above), the bright orange-rufous belly, the obsolescence of the red colouring on the head, and the paler hands and feet make this a very striking form among the subspecies of *bocourti*.

XLVIII.—*On a new Type of Stridulating-organ in Mygalomorph Spiders, with the Description of a new Genus and Species belonging to the Suborder.* By A. S. HIRST.

SEVERAL types of stridulating-organs are known to occur in the spiders of the suborder Mygalomorphae. These organs consist of arrangements of spines and bacillæ, the structure and disposition of which differ much in the groups and genera in which they are present. In some of the groups of the subfamily Aviculariinae (Thrigmopœeae &c.) the apparatus lies between the posterior surface of the mandible and the anterior surface of the maxillipalp, and this is also the case in some of the genera of the Dipluridæ. In other groups of

* The figures in brackets are those of a rather older individual.